
Space Weather Forecast

Issued on Saturday, 15 October 2022 at 01:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Moderate flares risk decreasing

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with a Moderate flare observed from the large sunspot that was on the northwest limb at 14/0944 UTC. This has now rotated over the horizon and is no longer visible on the Earth-facing solar surface, but its associated magnetic structure is visible above the Sun's northwest limb. This leaves two small further small and simple sunspots on the disc, however they are both decaying. There are also a number of filaments (lines of material held together by the Sun's magnetic field) on the Earth-facing disc. These can be a source of coronal mass ejections (CMEs), and one of these erupted in the southwest at 14/2200 UTC. It remains too soon to judge if any subsequent CME will be Earth-directed. No other Earth-directed CMEs have been observed.

Solar Wind / Geomagnetic Activity: The solar wind, is indicative of the arrival of the fast wind from a coronal hole, likely combined with some weak CME influence. Background speeds at 300 km/s erratically increased to peak at slightly elevated levels of 450-500 km/s by 14/2030 UTC. The total magnetic field strength, was Weak at first but increased to Moderate around 14/0300 UTC, before jumping to Strong at 14/0815 UTC. This then declined back to be mainly Moderate from 14/1400 UTC. The important north-south component, became strongly negative (southward) directed at 14/0815UTC, before rotating to be mainly positive (northward) but with further brief periods of negative pointed field. Geomagnetic activity was Quiet to Active (Kp 2-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be mostly Low, with a chance of rising to Moderate on day 1 (15th), mainly from any flares from the sunspot that has rotated over the limb. While this is no longer on the Earth-facing disc, the associated magnetic looping remains visible above the northwest limb, potentially allowing any notable flares to be observed from Earth.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs, however the peripheral effects of a CME passing south of Earth late day 2 or 3 (16th or 17th) may be observed. Otherwise the ongoing fast wind influence from the coronal hole is expected to ease towards background. Geomagnetic activity is forecast to be Quiet to Unsettled, but with a chance of Active intervals early day 1 (15th) or late day 2 (16th) into early day 3 (17th).

Energetic Particles / Solar Radiation: The count rate of energetic particles is expected to remain at background levels with no solar radiation storms occurring.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	10	5	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	20	5	5	5
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	2	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)